# NOTES

ON

# MASSAGE

INCLUDING

## ELEMENTARY ANATOMY AND PHYSIOLOGY

BY

JESSIE M. WARD

INSTRUCTOR IN MASSAGE IN THE PENNSYLVANIA, PHILADELPHIA, JEFFERSON, WOMAN'S, AND PRESBYTERIAN HOSPITALS; CLINICAL LECTURER AT THE PHILADELPHIA POLYCLINIC.



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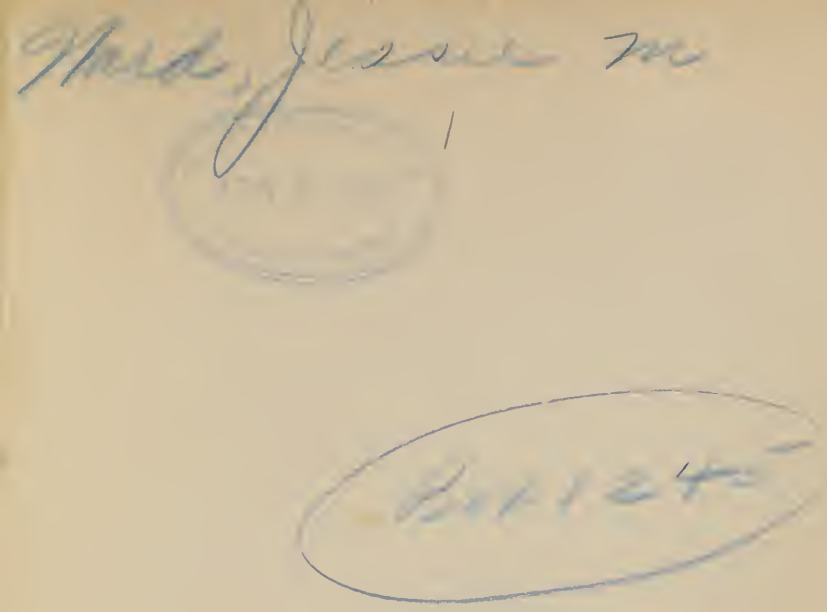

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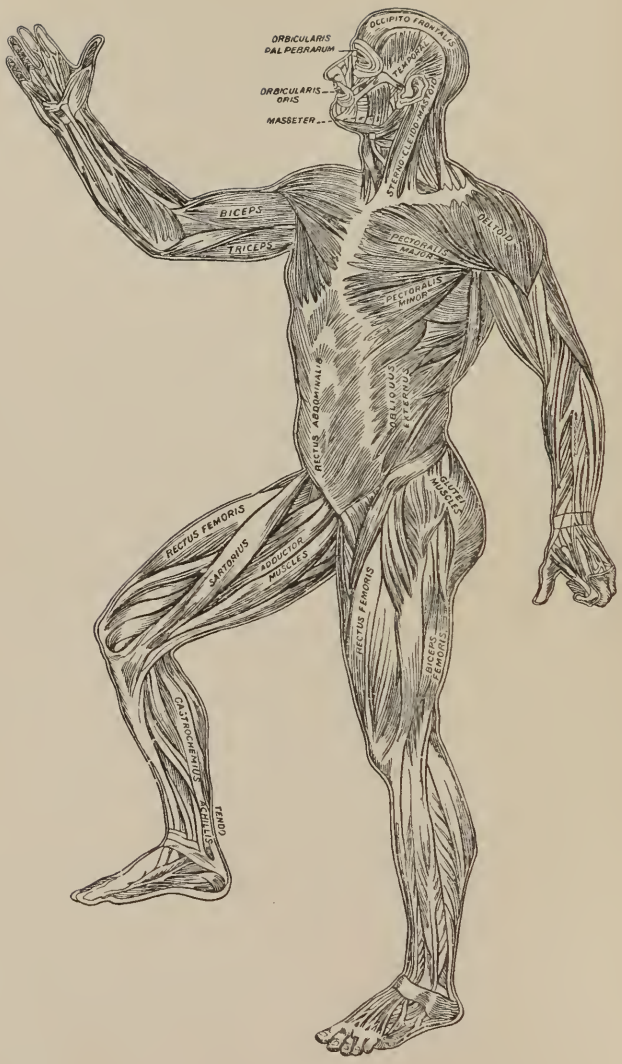
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RECTUS ABDOMINALIS
GLUTEAL MUSCLES
RECTUS FEMORIS
SARTORIUS
ADDUCTOR MUSCLES
TENSOR FEMORIS
BICEPS FEMORIS
GASTROCNEMIUS
SOLEUS
TENDO

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# DEDICATION

TO

My Pupils in the Hospital Training Schools,

AND THOSE WHO HAVE STUDIED PRIVATELY, I DEDICATE THIS LITTLE BOOK, HOPING IT MAY SERVE TO REFRESH THEIR MEMORIES, AND AID THEM IN A WORK IN WHICH WE ARE MUTUALLY INTERESTED.

J. M. W.

# PREFACE.

In presenting my "Notes on Massage" in book form I have been actuated solely by a desire to economize the time of my pupils during class hours. The time thus saved may be more profitably used in the practical demonstrations so very essential in acquiring the technic of Massage.

These notes are the result of the reading of many and various books on the subject of Massage and a careful sifting of their contents. Most of the works on this subject are too voluminous or too technical to afford the necessary aid to a person desiring simply an outline of the subject.

I have not made use of drawings in these "Notes," as I think them quite inadequate to give an idea of the various manipulations used in Massage. Pictures may serve to represent the structure to be worked upon, but fail utterly when used to illustrate the manner of working; this *must* be done by practical demonstration and the supervision of the teacher.

It is only in the arrangement of the subject-matter that I claim any originality. I know of no book on Massage

—at least, in this country—which gives, first, the anatomy of a part, and then follows with the necessary directions for the manipulation of that part.

J. M. W.

*Note*.—If, in the directions for the manipulation of a part, I have made use of the method entire of any one person, I have given due credit by affixing the name of that person.

# CONTENTS.

# NOTES ON MASSAGE.

## INTRODUCTION.

It would be a foolish proceeding to put tools into the hands of a person utterly ignorant of their uses, and even of their names, and expect him to be able to do with them what a skilful workman could do; and yet this is what is attempted when Massage is taught without first giving the pupil an idea of the materials with which he is going to work—namely, those contained in the structure of the human body.

This is why we begin the study of Massage with at least an outline of anatomy and physiology; *Anatomy*, telling of the *situation* and *structure* of the parts constituting the body, and *Physiology*, explaining their *properties* and *functions*.

It would not be possible in a brief course of study to give more than an outline of these subjects, as a long time is necessary to study them in detail,—and this may be done later on, if desired,—but we will glance at them in a way calculated to enable the pupil to understandingly take up the study of one of the important remedial measures—namely, Massage, or Mechanotherapy—healing with the hand, as it is sometimes called.

## STRUCTURES ESPECIALLY CONCERNED IN MASSAGE.

Massage, in its varied application, has either direct or indirect relation to every structure and function of the body, but affects especially the following:

1. The *skin*, with its connective tissues and the infinite number of minute blood-vessels and sensitive terminal nerve filaments.

2. The *connective tissue* lying just beneath the skin, with its rich supply of veins and lymph-vessels.

3. The *muscles*, which receive special attention in the various manipulations of massage, both as individual muscles and as functional groups.

4. The *large blood-vessels*, both arteries and veins, but principally the veins, the circulation of which may be readily accelerated or impeded according as the manipulations are applied in the direction in which the blood runs in the vein or in the opposite direction. The large lymph channels which usually accompany the larger veins are also brought directly under the influence of massage through appropriate manipulations. The heart itself may be reached by certain special procedures and is greatly influenced by nearly all forms of manipulation.

5. The *large nerve trunks* are influenced by all forms of manipulation, but especially so by certain procedures which are particularly efficacious in producing stimulating or sedative effects.

6. *All the large viscera* of the abdomen, stomach, colon, small intestines, pancreas, spleen, liver, and kidneys, may be brought more or less directly under the influence of massage by a skilled operator.

7. The *bones*, *joints*, and *ligaments* are also structures which are directly affected by massage.

## DEFINITION AND THEORY OF MASSAGE AND CLASSIFICATION OF MOVEMENTS.

Massage is a *scientific*, *passive* manipulation of the soft tissues—muscles—of the body for a therapeutic purpose. The word comes to us from the French *masser*, to knead; and the theory is that it improves the local and general nutrition of the body. Definition.

There are four principal manipulations, and these may be divided and subdivided, but each of the various manipulations must come under some one of the four principal movements:

Classification of movements.

| *English.* | *French.* |
|---|---|
| 1. Stroking, | Effleurage. |
| 2. Friction, | Frictions. |
| 3. Kneading, | Pétrissage. |
| 4. Percussion, | Tapotement. |

Stroking is a centripetal pressure, which acts on the venous and lymphatic circulation, not only in the parts worked upon, but in the surrounding tissues. It counteracts incipient inflammation, is a valuable procedure in traumatism,—the condition of one suffering from injury,—prevents threatened mortification or gangrene, and has, according to Dr. Kleen, "the property of removing fatigue, acting as a restorative to groups of tired muscles." Stroking. Therapeutic effects.

Friction is a firm, circular centripetal pressure, which removes thickening or deposits. Friction.

Kneading is a double circular centripetal pressure, intended to act particularly upon the muscles. Kneading.

Percussion is a wrist movement,—hands stroking quickly,—and its special function is to stimulate the muscle fibers and cause them to contract. This is independent of the nerve stimulus by reason of the irritability of the muscle itself—so say a number of experts of the German school. Percussion.

There are five kinds of percussion, namely: Hacking, Clapping, Punctation, Beating, and Vibrations.

Vibrations are wave-like muscular tremblings, transmitted through the hands of the operator to the patient, and must be felt to be properly understood. They are to massage what the *interrupted* current is to *electricity*.

## EFFECTS OF REGULATED EXERCISE.

Massage gives the necessary exercise to the patient at a time when he is unable to exercise for himself. The effect of this regulated exercise is the transformation of physiological forces.

All those vital processes which are essential to life—as digestion, circulation, respiration, secretion—are carried on independently of the will, and give rise to a large and constant amount of activity in the system. Labor and exercise are performed by calling into action an additional system of agencies—those of the voluntary muscles; and to maintain these in a state of activity involves an extra requisition upon the various involuntary organs.

Exercise increases the movement of the heart in both force and frequency and accelerates the flow of blood through all the parts of the body.

The circulation is also aided by the contraction of the voluntary muscles, which, by pressing upon the walls

of the veins, tend to force along the current of blood. This increased activity also effects the speedy removal of all waste products by rapidly transferring them to the proper organs for rejecting such products.

Exercise affects respiration as well as circulation, as whatever quickens the pulse hastens the breathing; and it is the office of respiration to furnish the prime mover of vital changes—oxygen.

*Effect upon Digestion.*—As power comes from food in the case of the living machine, increased expenditure of power, of course, implies increased consumption of food; hence, exercise sharpens the appetite.

## BONES.

The first thing to be considered in the study of anatomy is the skeleton or framework of the body, which consists of bones. The functions of these bones are to support the body, to protect the organs, and to afford leverage for the action of the muscles. Skeleton.

Bones are animal tissues which have become naturally petrified, and when analyzed are found to consist of gelatin and blood-vessels one-third (that is, organic matter), and calcium salts, etc. (inorganic material), two-thirds. Bones, what they are.

The bones are surrounded by a tissue called the periosteum (around bone), which serves as an attachment for tendons and as a medium for the vascular supply.

The bones receive their blood-supply by the minute openings in their surfaces, through large apertures at the ends, and through the nutrient canal, which contains the substance known as marrow.

In the adult there are 200 bones: Long bones, as the

femur, or the thigh bone; short bones, as the carpal, or wrist bones; flat bones, as the ribs; and irregular bones, as the vertebræ, or bones of the spine.

## MUSCLES.

You will remember that it was said that one of the functions of bones was to afford leverage for the action of the muscles. What, then, are muscles? The word "muscle" comes from the Latin word *musculus*, meaning a little mouse, as the ancients fancied they saw a resemblance to that rodent. The muscles are the fleshy part of the body, and are composed of organic tissues having contractile power under the stimulus of the nerves, although they may be made to contract artificially by the application of heat, cold, acids, electricity, and percussion.

Muscles, what they are.

Muscles provide the means of movement in animals, and are of two kinds: striped, or voluntary,—under the control of the will; and unstriped, or involuntary,—not under the control of the will.

Action.

They are attached to the bones either directly or by the intervention of fibrous structures called tendons.

Attachment.

Every muscle has a belly and two extremities called the origin and the insertion. The origin is the fixed, and the insertion is the movable, extremity. They vary in form and size, those of the limbs being long,—especially the superficial ones,—while those surrounding and protecting the bones and joints lie deeper.

Form.

In the trunk they are broad and flat, forming the walls of the cavities which they inclose, and that they are adapted to the localities where they are found may be proved by the fact that the Sartorius, the longest muscle in the body,—the length of its fibers being nearly two

Location and size.

feet,—is to be found on the thigh, where rapidity is needed, while the stapedius, a small muscle of the internal ear, weighs about one grain, and its fibers measure not more than $\frac{1}{6}$ of an inch.

Muscles receive their names :

1. From their *situation*—viz., Tibialis—on the tibia, or large bone of the leg.

2. From their *direction ;* as the Rectus Femoris—straight on the femur.

3. From their *uses ;* as the flexors, extensors, abductors, and adductors, etc.

4. From their *shape ;* as the Deltoid—like the Greek letter Δ. How named.

5. From the *number of their divisions*—viz., Biceps, two-headed ; Triceps, having three heads.

6. From the *points of attachment ;* for instance, the sternocleidomastoid. This muscle is attached to the sternum (breast-bone), the clavicle (collar-bone), and mastoid process (the protruding part of the temporal bone behind the ear).

The great principle running through and governing the muscular system is the principle of antagonism. Antagonism. Every muscle has its antagonist. There is one set of muscles to lift, and another to pull down ; the elevators are the antagonists of the depressors, the flexors antagonize the extensors. We may set it down as a general rule that "all the muscles in the front part of the human body are the antagonists of those of the back part of the body " ; hence, these muscles, in action at the same time, strike the medium between their respective powers, and the body is held erect. The muscles of the back and front of torso keep the trunk erect on the pelvis. The muscles of the front and back of the thigh, acting

together, preserve the equilibrium of the body on the knee-joints, and the muscles of the front and back of leg perform the same office for the ankle-joints, so that the figure is kept erect on the soles of the feet (Hartley).

Number of muscles in the body.

There are 229 muscles in the body, not including those of the alimentary canal and those in the blood-vessels. They are arranged as follows :

| | |
|---|---|
| In the vertebral column and trunk, . . . . . | 51 |
| Muscles of neck, excluding vertebral column, . . . . | 24 |
| " " head, . . . . . | 37 |
| " " limbs, . . . . . | 117 |

Source of muscular energy.

Muscular activity is accompanied by the production of heat ; and the source of muscular energy is the oxidation of glycogen—animal starch—stored in the muscles.

Artery. Vein. Capillary. Lymphatic nerve.

Entering the substance of each muscle is at least one artery, which conveys the blood *to* the muscle ; this artery ends in a network of capillaries, from which a vein arises and conveys the impure blood *out* of the muscle. Another small vessel—a lymphatic—also arises within the muscle, and conveys the lymph. Each muscle is also penetrated by a nerve.

## SKIN.

This structure, which envelops all portions of the body and protects the deeper parts, is an organ of excretion and absorption.

Epidermis. Derma.

The Epidermis, or false skin, contains no blood-vessels or nerves, and is simply a scaly layer which protects the True skin, or derma, underneath. A blister shows the separation of the two layers, with some fluid between them. The True skin is richly supplied with blood-

vessels, nerves, and lymphatics, and in this layer reside the functions of excretion and absorption.

The skin contains millions of minute tubes, known as "sweat" glands; also the fat glands and hair-follicles. Glands. The sweat glands, by constantly removing from the body a watery vapor known as perspiration (in which they are aided by evaporation), help to regulate the temperature of the body. In addition to the action just spoken of, they have the important function of throwing off from the system waste material similar to that excreted by the kidneys—urea; hence are regarded as supplementary to the kidneys. In warm weather, when the skin is most active, the amount of perspiration is largely increased, and the amount of urine correspondingly diminished, while in the winter the conditions are reversed. An average amount of perspiration formed in twenty-four hours is about two pints. Perspiration in twenty-four hours. The skin is thicker on all exposed parts of the body—on the outside of the legs, arms, etc.: especially on the buttocks, where it is very thick; on the soles of the feet, where it acts as a padding to prevent any shock or injury to the system from sudden or violent concussion; and in the palms of the hands, to protect them from abrasions in the acts of grasping, pulling, etc.

## BLOOD.

Blood, the great nutritive fluid of the body, distributes to the different tissues material necessary for their proper maintenance and activity. Blood has also the important function of removing from the body through certain organs—viz., kidneys, skin, and lungs—worn-out and waste matter, which if retained in the body would produce serious disease, perhaps death.

Of what composed.

It is composed of a liquid portion, or plasma, and a solid portion, or corpuscles. The liquid, when separated from the solid matter, is almost colorless, and contains the principal elements of nutrition, which it distributes to the different tissues, and receives in return waste material which is to be discharged from the body.

Corpuscles.

Corpuscles are red and white, and float in the plasma, constituting one-half the bulk of the blood. The red corpuscles are by far the more numerous and important. They resemble a thick coin which has been made thin in the center on both sides, or biconcave. They are exceedingly small, and 3500 of them laid side by side on their flat surfaces would be required to cover the space of one inch. They are, of course, not visible to the naked eye, and when examined with the microscope they appear straw-colored; but when vast numbers of them are crowded together, as in the normal condition of the blood, they give to it the characteristic red color.

Red corpuscles.

The red corpuscles are the agents that receive the oxygen from the air in the lungs and distribute it to the body throughout.

White corpuscles.

White corpuscles are fewer in number but are larger in size than the red, and are globular in form; their function is not definitely known. The total quantity of blood in the body represents about one-tenth of its weight, or about fourteen pints or pounds.

Blood is an alkaline fluid, somewhat heavier than water.

Color.

Arterial blood is of a rich red color, while the venous blood is dark blue or purple. Tissues—such as the nails, hair, cartilage, etc.—are not directly supplied with blood, but receive their nutrition by absorption from surrounding parts.

Blood circulates throughout the body by means of

blood-vessels, which are divided into arteries, veins, and capillaries, and the motive power which propels the blood through these vessels is the heart, which we will study in due time. Vessels.

*Artery* originally meant "air-carrier"—vessels which carry blood from the heart after it has been purified in the lungs. These vessels pulsate, and when opened their blood escapes in spurts or jets, its color being scarlet. Arteries.

The walls are composed of three coats—external, middle, and internal. The external coat consists of white fibrous tissue, which is very strong and tough and protects the vessel. The middle coat consists of muscular and yellow elastic tissue, which is the principal cause of the greater thickness of the walls of the arteries compared with the veins; it also accounts for their elasticity and for the fact that they remain open when empty. Walls.

*Veins* carry blood to the heart. These vessels, like the arteries, have three coats, the external and internal being similar to the arteries; but the middle coat contains very little elastic tissue, which accounts for the comparative thinness of the walls of the veins and for the fact that they collapse when empty. Veins. Walls.

Veins, with the exception of those in the cranial, thoracic, and abdominal cavities, are supplied with valves, which are formed by the internal coat, and allow the blood to flow in but one direction; that is, toward the heart. Valves.

The pressure of blood in the veins is only about one-fourth that of the arteries. Sometimes the valves are rendered useless, and distention of the vessel occurs,—as in varicose veins,—when they become prominent and deformed. Blood pressure. Varicose veins.

When arteries become very small and lose their external and middle layers or coats, they consist of but one coat, and are called *capillaries*—from *capillus*, a hair. These vessels are often so minute that the red blood-corpuscles, in order to pass through them, are obliged to "double up" and pass through one by one. The thinness of the capillary walls and the slow and uniform movement of the blood in these vessels enables them to give direct to the tissues the elements which they contain and to receive in exchange the waste of the body. Capillaries.

## THE HEART.

The heart has been compared to a pump, and is a hollow muscular organ, pear-shaped, and about four or five inches in length, three inches through, and weighs from eight to ten ounces.

It occupies a position in the thorax, or chest, just behind the sternum, or breast-bone, and between the lungs, but mainly on the left side. The large end, or base, of the heart is directed upward and toward the right side, while the apex, or smaller end, is directed downward and to the left, two inches below the left nipple and one inch to the right of it. Position.

The heart contains four chambers,—namely, two *auricles* and two *ventricles*,—the capacity of each chamber being from four to six ounces. The auricles are above, the ventricles are below; or it may be divided into a right and a left side, each having an auricle and a ventricle. The ventricles do not connect with each other, nor do the auricles, but an auricle connects with the ventricle of the corresponding side. The openings between these cavities—called auriculo-ventricular—are Position of auricles and ventricles.

guarded by valves: the one on the right side is called *tricuspid*, the one on the left the bicuspid, or *mitral*. These valves are so arranged that the blood may pass from the auricles to the ventricles, but can not, in a normal condition, return. If the return were possible, the circulation of the blood would be constantly interfered with. The ventricles are longer than the auricles, and their walls are stronger, particularly the walls of the left ventricle, which drives the blood received from the lungs throughout the entire system. The auricles contract simultaneously; the contraction of the ventricles follows after a short interval. This double action represents a pulsation of the heart, of which there are from sixty to eighty during a minute. Valves.

The heart, and also the beginning of the great vessels at the base of it, are surrounded by a closed sac —the pericardium—composed of fibrous tissue and lined with a serous membrane. The inner wall, or visceral layer, of this membrane is adherent to the heart; between it and the outer layer exists a space, better marked at the lower portion. The serous membrane lining this space secretes a fluid, of which there is usually about one or two teaspoonfuls present; thus keeping the membrane soft and moist, and limiting friction when the two surfaces rub against each other during the action of the heart. The broadest portion of the pericardium, which is the outer layer, corresponds in situation to the apex of the heart. This arrangement prevents any interference with the movement of the apex of the heart, which would ensue if the apex, or smaller portion of the pericardium, were below. The base of the pericardium is attached to a portion of the upper surface of the diaphragm. Pericardium.

## THE CIRCULATION.

The circulation of the blood is generally treated under *four* heads :

1. The *greater* circulation, or the circulation through the body.

2. The *lesser*, or pulmonary, circulation—the course of the blood through the lungs.

3. The *portal* circulation, which is a branch of the greater or systemic circulation, and carries blood through the stomach, spleen, pancreas, and liver.

4. The *coronary* circulation, which is the course of the blood through the walls of the heart.

The greater circulation of the blood is effected in the following manner : The venous blood of the body is collected by two large veins—the superior and inferior venæ cavæ. The superior vena cava receives the blood from the head and upper extremities, while the inferior vena cava collects the blood from the lower extremities. These vessels are connected with, and discharge their contents into, the right auricle of the heart, which then contracts and forces the blood into the right ventricle through the opening before spoken of—auriculo-ventricular. The contraction of the ventricle, which follows, closes the valves guarding this opening ; the blood, being then unable to return to the auricle, is forced out of the ventricle into the pulmonary artery—a large blood-vessel connected with the right ventricle. Valves also guard the opening into this vessel. The pulmonary artery divides into two branches, carrying the blood to each lung. After reaching these organs the branches of the artery grow smaller and exceedingly numerous, and at last they become minute vessels, known as capillaries,

Venæ cavæ.

Pulmonary artery.

which surround the air-vesicles of the lungs. The venous blood has now been carried from the heart to the lungs, and it is at this point that the blood in the capillaries surrounding the air-vesicles frees itself from the carbonic acid gas and some other impurities, and receives in return oxygen from the air contained in the vesicles.

The blood is now changed in character; the color, instead of being blue, or venous, is red, or arterial, and thus, enriched and purified, and in condition to nourish the tissues, is carried from the lungs to the left auricle of the heart by four large blood-vessels—the pulmonary veins. These vessels are continuous with the pulmonary artery through the medium of the capillaries which surround the air-vesicles. The left auricle, after receiving the blood from the pulmonary veins, contracts, and its contents pass into the left ventricle, which, being filled, immediately contracts and forces the blood into the aorta, and closes the left auriculo-ventricular valve, thus preventing the return of the blood to the auricle. The opening from the ventricle into the aorta is also guarded by a valve, which bars the return of the blood to the ventricle. The aorta begins at the left ventricle, is the main artery of the body, and through it passes the arterial blood into the smaller arteries and capillaries throughout the system. In these last-named vessels the nutrition contained in the blood is given direct to the tissues, and the blood receives in exchange the waste elements which are to be discharged from the body. After performing this function the blood passes from the capillaries into the veins, the latter discharging their contents into the right auricle through the superior and inferior venæ cavæ, as already described. The blood has then made a complete circuit of the body. The blood of

Arterial blood.

the entire body passes through the heart in less than one-half a minute (Doty). Time occupied in a circuit.

## LYMPHATICS.

The lymphatics belong to a class of vessels known as absorbents, which exist in nearly all parts of the body except in the brain and spinal cord. The fluid which circulates through the lymphatics of the limbs and all the organs *not* concerned in *digestion* is called lymph. Absorbents.

This fluid is clear and colorless, and thus differs from the milky chyle, which the lacteals carry during digestion. The lymphatics are exceedingly delicate vessels, which have the property of absorbing certain materials from the tissues and conveying them into the circulation. The superficial lymphatics are immediately beneath the integument, accompanying the superficial veins. The deep are fewer in number and larger, accompanying the deep blood-vessels. The lymphatics of any part or organ exceed the veins in number, but in size they are much smaller. These vessels retain a nearly uniform size, and are interrupted at intervals by constrictions, which give them a knotted appearance, which is due to valves in their interior. Superficial. Deep.

The functions of the lymphatics are to remove effete matter from the tissues, and to take up slowly, from the worn-out tissues, that which is still available for purposes of nutrition, and to return it into the veins close to the heart, there to be mixed with the mass of the blood. Lymph passes into the circulation through the same channels as the chyle—viz., the Thoracic duct and the lacteals. The Thoracic duct conveys the great mass of the lymph and chyle into the blood. It is the common Two functions. Thoracic duct.

trunk of all the lymphatic vessels, excepting those of the right side of the head, neck, thorax, right upper extremity, right lung, right side of the heart, and the convex surface of the liver. It is from eighteen to twenty inches in length in the adult, and extends from the second lumbar vertebra to the root of the neck, terminating near the junction of the left internal jugular and subclavian veins. At its commencement it is about equal in size to the diameter of a goose-quill, diminishes considerably in size in the middle of the thorax, and again dilates just before its termination.

Right lymphatic duct.

The right lymphatic duct collects the lymph from the right side, and is a short trunk, about an inch in length and $\frac{1}{6}$ of an inch in diameter, and it terminates near the junction of the right subclavian and right internal jugular veins. Its orifice, as well as that of the thoracic duct, is guarded by valves, to prevent the entrance of blood from the veins.

## LOWER EXTREMITY.

Bones.

The bones of the lower limb are the Femur, or thigh bone; Tibia, or large bone of the leg; Fibula, Tarsus, and Metatarsus (*meta*, beyond, and *tarsus*, ankle) of the foot. The rim of the Pelvis marks the line of separation between the trunk and the lower limbs; this rim may be seen on the surface from its front to its termination behind, where it joins with the Sacrum, which bone constitutes the back part of the pelvis.

Muscles.

In order to intelligently give massage of the lower extremity, it is necessary that we should know something of the situation of the muscles, their names, action, etc., and especially of those that govern the appearance of

the surface, as it is over these muscles the hand passes in stroking, friction, etc. Beginning with stroking of the foot, the hands pass over the ligaments of the extensor muscles of the foot and toes. The sole of the foot has a special set of muscles called the muscles of the plantar region. They may be divided into three groups: first, the mass of abductors which act on the great toe; second, mass on the little toe side; third, the muscles occupying the space between the great and little toes.

Dorsum of foot.

Plantar.

In the second movement—stroking from ankle to knee—in the front portion of the leg we pass over the Tibialis anticus, peroneus tertius, and extensor muscles of the toes; these muscles are the antagonists of the muscles of the calf. In the posterior Tibio-fibular region we stroke the gastrocnemius, a two-headed muscle. The soleus, named from its resemblance to a sole-fish, is placed immediately underneath the surface muscle, but its sides appear on the surface; and the tendo Achillis, the thickest and strongest tendon in the body, is formed by the union of the tendons of the gastrocnemius and soleus. Continuing the stroke, the hand passes over the thigh and the mass that extends the leg (quadriceps extensor), which is composed of four muscles—rectus femoris, vastus externus, vastus internus, and crureus.

Front of leg.

Back of leg.

Soleus.

Tendo Achillis.

Quadrips extensor.

The mass on the inside of the thigh: the abductor muscles, the gracilis and pectineus, and the adductors longus, brevis, and magnus. The sartorius,—tailor's muscle,—which is the antagonist of the extensors of the leg, its action being to flex the leg on the thigh. The biceps, semitendinosus and semimembranosus are the flexors of the thigh, or hamstring muscles, which are also the antagonists of the extensor muscles of the leg.

Anterior femoral region.

Posterior femoral region.

RÉSUMÉ OF THE MUSCLES OF THE LOWER LIMB.

The tibialis anticus arises from two-thirds of the side of the tibia, and its use is to flex the foot and at the same time to rotate it inward. In conjunction with the extensors longus digitorum and proprius pollicis it flexes the foot only. In riding, the tibialis anticus assists in keeping the foot in the stirrup. It is supplied by the anterior tibial nerve. Tibialis anticus, its uses.

The extensor proprius pollicis arises from the anterior border of the fibula, and its tendon passes in a distinct compartment beneath the annular ligament to the first phalanx of the great toe, which it extends. Extensor proprius pollicis.

The extensor longus digitorum arises from the fibula; its tendon passes beneath the annular ligament to the dorsum of the foot, where it divides into four tendons, which are inserted into the top of the second, third, fourth, and fifth toes. Acting with the tibialis anticus, as before said, it flexes and adducts the foot. The gastrocnemius is a two-headed muscle, and arises from the lower part of the femur, and, with the soleus,—before spoken of,—extends the foot. The gastrocnemius is supplied by the popliteal nerve. Extensor longus digitorum. Action. Posterior region of leg.

Flexor longus digitorum, flexor longus pollicis, etc., serve to flex the toes, but we will not go into detail as regards them. Flexors.

The muscles with which we have to do here are the sartorius and the quadriceps extensor. Anterior femoral region.

The sartorius arises from the ilium and is inserted by a thin tendon a short distance below the head of the tibia on the inner side. Sartorius.

The sartorius flexes the leg on the thigh and the thigh on the pelvis. Uses.

The quadriceps is composed of the rectus femoris, vastus externus, vastus internus, and crureus. The rectus femoris is of pelvic origin, while the rest are of femoral origin. They are all inserted into the patella, or "knee-cap." Their action is to extend the leg upon the thigh. Nerve-supply, anterior crural. Quadriceps extensor.

Gracilis, pectineus, adductors longus, brevis, and magnus. The gracilis adducts the thigh and flexes the leg on the thigh. Internal femoral region.

The pectineus draws the femur inward and forward, as in crossing the limbs ; hence is a flexing adductor.

The adductors mentioned, as their names would imply, serve to adduct the femur.

The biceps, semitendinosus, semimembranosus (hamstring muscle).

Biceps (external hamstring) flexes the leg on the thigh. Posterior femoral region.

Semitendinosus flexes the leg on the thigh and rotates it inward.

Semimembranosus flexes the leg on the thigh and aids in extending the thigh on the pelvis. These two last-named muscles form the inner hamstring. The nerve-supply is the sciatic.

The femoral artery as it passes along the popliteal space is known as the popliteal artery, which divides into the anterior and posterior tibial arteries ; then the posterior tibial divides into the internal and external plantar arteries, forming the plantar arch, from which the foot and toes are supplied with blood. Blood-supply.

There are two principal veins—the external and internal saphenous. Veins.

### MASSAGE OF LEG.

1. Stroking, with both hands, from ankle to hip, the hands, on the outside, reaching to the crest of the ilium; the thumb, on the inside, going down the groin.

2. Friction, with the thumb on the outside of the leg.

3. Stroking, with one hand over the same surface.

4. Friction, with thumb on the inside of the leg.

5. Stroking, with one hand over the same surface.

6. Friction, with the thumb or the heel of the hand upon the outside and inside of the thigh.

7. Kneading, with both thumbs upon the different muscles of the leg.

8. Kneading or pinching, applied to the different muscles of the thigh, covering especially the quadriceps extensor, sartorius, the adductors, and the hamstring muscles.

9. Stroking, with both hands over the whole extremity.

10. Hacking on the muscular part of the limb, from ankle to hip, on the outside and on the inside. (This manipulation may be performed in a centripetal or a centrifugal direction.—Ostrom.)

## ARM.

Bones. The bones of the arm are the Humerus, Ulna, and Radius; the Humerus being in the arm proper and the Ulna and Radius in the forearm.

Muscles of arm proper. The upper arm, or arm proper, is made up of the humerus, covered by three muscle masses—namely, the deltoid, or shoulder muscle; the biceps, on the front of the arm; and the triceps, on the back of the arm. The

flat space between these muscles is filled in by the brachialis anticus flexor.

Lower arm.

The forearm is composed of two bones—the ulna and radius—and two muscle masses. The extensors and supinators combined form the mass on the outside or back of the arm, and the flexors and pronators occupy the inside or palm side.

Bones of hand.

The wrist bones are eight in number, and take part in forming the arch of the wrist. In the hand we have the palm, thumb, and finger bones, or phalanges.

Muscles of hand.

The palm of the hand is covered by three muscle masses. First, the abductors and flexors of the thumb; second, the abductors and flexors of the little finger; third, the mass of muscles and tendons occupying the middle of the palm and the spaces between the metacarpal bones. This arrangement of the muscles of the palm of the hand—palmar fascia—is similar to that of the foot, or plantar fascia.

Pronators. Supinators.

The pronators are those muscles which turn the palm downward, while the supinators are those which turn the palm of the hand upward; hence the pronators and supinators are antagonistic.

In stroking the arm from the wrist to the spine of the scapula, we pass over, on the outside of the arm, the extensor muscles on the forearm, the triceps, and deltoid of the arm proper. On the inside of the forearm the strokes pass over the flexors and the biceps of the arm proper.

## RÉSUMÉ OF THE MUSCLES OF THE ARM.

Deltoid.

The deltoid, which gives form to the shoulder, is named from the Greek letter Δ. Its use is to raise the arm to the horizontal position, and it is supplied by the circumflex nerve and artery.

The biceps on the arm proper is a two-headed muscle, and is inserted into the tuberosity of the radius. Its use is to flex the forearm and to supinate it. The nerve-supply is the external cutaneous. Biceps.

The brachialis anticus flexor arises from the anterior surface of the humerus and is inserted into the ulna. Its use is to flex the ulna, consequently the forearm upon the humerus. It is supplied by two nerves—the external cutaneous and the musculospiral. Brachialis flexor.

The triceps is composed, as the name expresses, of three heads—one of these arises from the scapula, and the remaining two from the posterior part of the humerus —and is inserted into the ulna. Its use is to extend the forearm, and it is supplied by the musculospiral nerve. Triceps.

We have in the forearm the flexor carpi radialis, flexor carpi ulnaris, and the flexor sublimis digitorum, etc. Flexors of forearm.

The first named is a flexor of the wrist, supplied by the median nerve. The second is also a flexor of the wrist on the ulnar side, and is also supplied by the median nerve. The third is the most powerful of the superficial muscles and its use is to flex the second and third rows of phalanges and to assist in flexing the first row and the carpus ; the median is the nerve supplying this muscle.

On the outside of the forearm we have the extensor carpi radialis, extensor communis digitorum, the extensor of the little finger, etc. Supinators and extensors.

The arm is supplied with blood by the subclavian artery, which, reaching the axillary space, becomes the axillary ; then the brachial to the bend of the elbow, where it divides and becomes the ulnar and radial arteries—the radial artery forming the deep palmar arch, and the ulnar forming the superficial palmar arch. Blood-supply.

There are two large veins running along the inside Veins.

and outside edges of the biceps, called the cephalic and basilic; the cephalic on the outside and the basilic on the inner edge of the muscle. These two veins unite at the termination of the biceps at the elbow-joint, and then throw out branches in all directions over the arm and back of the hand. It is at this junction of the cephalic and basilic veins that venesection—bleeding—is performed.

Cephalic and basilic.

Bleeding.

All of the tendons that act on the hand and fingers pass through and underneath a strong fibrous band which arches over the wrist bones, so that the tendons are in a manner confined, and forced to expend their force on the band, which serves as a fulcrum to control their actions, to clinch the hands, or to straighten them out.

Annular ligament.

## MASSAGE OF THE ARM.

1. Stroking, with hand on the outside, from wrist to the spine of the scapula.

2. Stroking, with the other hand on the inside of the arm, the thumb reaching down on the pectoral muscles.

3. Friction, with thumb over the extensor muscles of the hand and fingers.

4. Stroking over the same surface.

5. Friction, with thumb over the flexor muscles of hand and fingers.

6. Stroking over the same surface.

7. Friction, with the thumb or the heel of the hand over the arm proper.

8. Stroking over the whole arm, first on the outside and then on the inside.

9. Kneading, with the two thumbs, the muscles of the forearm; and in the arm proper roll the muscles

with heels of hands, including the muscles of the shoulder—the deltoid and the supra- and infra-spinatus.

10. Hacking of both sides of the arm (Ostrom).

## THE THORAX, OR CHEST,

Is the bony framework which contains the heart, lungs, and important blood-vessels and nerves.

It is formed by the sternum, or breast-bone, in front, and by the ribs and vertebræ at the sides and back, and is separated from the abdominal cavity by a muscular partition, known as the diaphragm or "midriff." Bones forming the thorax. Midriff.

The sternum is a flat and narrow bone, about seven inches long, situated in the front of the chest, as before said, and supporting the clavicles, or collar bones, and the ribs, with the exception of the last two. Sternum.

The ribs are twenty-four in number, twelve on each side, and are numbered from above downward. The seven upper are true ribs, and the five remaining are false, the last two of which are floating ribs. Ribs.

The seven upper are called true ribs, because they are connected with the sternum by their own cartilages, while the eighth, ninth, and tenth are connected indirectly by cartilages with the sternum. True ribs. False ribs.

The two lower ribs—the eleventh and twelfth—are simply connected with the vertebræ, and are known as floating ribs, as they have no attachment in front. Floating ribs.

The peculiar arrangement and attachment of the ribs render them a very important element in respiration; during this act the ribs are elevated and depressed by the action of the respiratory muscles. When the ribs are elevated during inspiration, the chest is enlarged and air passes into the lungs; in expiration the ribs are de- Inspiration. Expiration.

pressed, the cavity diminished in size, and the air in the lungs is expelled.

In stroking with both hands over the chest, one on each side of the sternum, we pass over the pectoral muscles, and in continuing the stroke downward we take in the intercostals and the serrati, or breathing muscles. Before going further it may be well to know something of respiration, and what we mean by that term. Chest muscles. Respiration.

The most explicit definition that I can obtain is this: "Respiration is the process by which oxygen penetrates the substance of living organisms, and the changes which accompany or follow its introduction" (Huxley). The respiratory apparatus consists of the mouth, nose, larynx, trachea, bronchial tubes, and air vesicles, or cells, the lungs being chiefly composed of the latter.

The larynx may be easily located externally; the prominence known as "Adam's apple" forms the upper portion, the lower border being about 1½ inches below. The opening into the larynx is covered by a leaf-shaped piece of cartilage, known as the epiglottis, which prevents food and other substances from entering the windpipe. The trachea, or windpipe, is the continuation downward from the larynx of a tube about four or five inches long, and composed of cartilaginous rings, fibrous membrane, and a small amount of muscular tissue. The use of these rings is to keep the walls of the trachea separated at all times. The trachea divides into two branches at about the third dorsal vertebra, these branches being called the right and the left bronchus. These tubes, after entering the lungs, divide into a great number of branches, or bronchial tubes, which further divide and subdivide, until they become exceedingly minute, and end in little pouches or vesicles. The walls Larynx. Trachea. Bronchi.

of the air cells, and the capillaries surrounding them, are so thin that an interchange of gases readily takes place. Air cells.

The respiratory tract is lined throughout by a mucous membrane, which is kept moist, and prevents friction during the passage of air through the tube. Its construction is peculiar, having little hair-like processes which are constantly waving toward the outer world, and assisting in preventing the entrance into the lungs of dust and irritating particles.

The lungs are two pyramidal or cone-shaped organs, longer in the back than in the front, each weighing about twenty ounces, the right one being a little heavier than the left. They are divided by deep fissures into lobes, the right lung having three and the left two lobes. The upper portion or apex of the lungs extends to or just above the clavicle; the lower portion or base descends in front to about the sixth rib; on the side to the eighth, and in the back to the tenth. Lungs.

Each lung is covered by a closed sac called the pleura, one of its layers being adherent to the lung and the other lining the chest walls. The cavity thus formed between the linings contains a small amount of fluid, to prevent friction during the action of the lungs. The walls of these air cells are so very thin that it is here that the purification, or change from venous to arterial blood, takes place. Pleura.

The respiratory act—of which there are from sixteen to twenty a minute—consists of inspiration and expiration. The lungs during life are never entirely collapsed. This is owing to the fact that there is a certain amount of air which can not be expelled, called residual air, which remains in the lungs after expiration. Respiratory act.

### MASSAGE OF THE CHEST.

1. Position of the patient : lying flat on the back without a head rest. Stroking with both hands, one on each side of the sternum. Stroking performed upward, outward, and downward, the tips of the fingers meeting at the ensiform cartilage of the sternum.

2. Friction with thumb over the pectoralis major and minor, one side at a time. In performing this manipulation the fingers should be placed in the axilla.

3. Kneading or pinching (if the pectoral muscles be paralyzed).

4. Hacking, or punctation, on both sides of chest, punctation being used in circles around the heart principally. Clapping is sometimes used to induce expectoration (Ostrom).

## THE ABDOMEN.

The abdomen is that part of the body which lies between the thorax, or chest, and the bottom of the pelvis. It is lined with peritoneum, and its contents are the stomach, liver, spleen, pancreas, kidneys, bladder, intestines, and, in the female, the uterus and ovaries.

Bones. Ossa innominata, sacrum, and coccyx.

Muscles The external, or descending, oblique covers the fore part of the abdomen. It is the largest and most superficial of the three flat obliques, which together form the mass between the tenth rib and the rim of the pelvis. Its muscular portion occupies the sides; its skinny portion, or aponeurosis, the front part of the abdomen.

External oblique.

There are two other muscles underneath which form part of the mass above the crest of the ilium—the inter-

nal oblique, whose fibers are at right angles with the surface muscle, and the transversalis, which runs horizontally. Internal oblique.

The action of the obliques is to raise the pelvis, thigh, and leg from the ground and swing them forward, as in the act of walking, and to compress the viscera. Action.

The rectus abdominis is an antagonist of the muscles of the back, and extends along the whole front of the abdomen, being divided into two parts by a ligament, which forms a line called the linea alba. There is a small muscle in the shape of a pyramid—hence its name pyramidalis—which arises from the os pubis, and proceeding upward terminates in a small point, which is inserted into the central line, or linea alba, of the abdomen. Linea alba. Pyramidalis.

## MASSAGE OF THE ABDOMEN.

First movement—friction with the tips of the fingers in the umbilical region—is intended to act upon the small intestine. Small intestine.

Second: Kneading, with the heels of the hands, all the muscles of the abdomen; acts chiefly upon the muscles. Muscles.

Third: Stroking. Spread the right hand over the abdomen so that the heel of the hand covers part of the ascending colon; press upward, with the heel of the hand across the transverse colon, with the radial border of the hand, and with the tips of the fingers make pressure down the descending colon; pass lightly over the pubic arch with the ulnar border of the hand, when the heel of the hand is again ready to move up the ascending colon, as at first. This movement affects the large intestine. Large intestine.

Fourth: Transverse friction, with both hands, from right to left, over the entire abdomen. Acts upon the muscles. Muscles.

Fifth: Turn the patient over and thoroughly clap the sacrum. This manipulation affects the rectum. Rectum.

*Note.*—Never manipulate the abdomen at monthly periods until at least three days after the beginning of the flow; and in cases of a tendency to hemorrhage, not until three days after the flow has ceased.

Carefully palpate the abdomen before beginning to work, in order to ascertain if there are any tender spots. In case you discover points of extreme sensitiveness, seek the advice of the physician in charge of the case.

## DIGESTION.

"All work implies waste. The work of the nervous system and that of the muscles, therefore, implies consumption, either of their own substances or something else. And as an organism can make nothing, it must possess the means of obtaining from without what it needs, and of throwing off from itself unnecessary or waste material," and you will see, if you study the subject, this is just what it does. The body feeds and it excretes. Now, let us look for a moment at the mechanism by which nutriment—or that which the body needs—is distributed to it. Excretion—a throwing off.

The organs which convert food into nutriment are the organs of alimentation; those which distribute nutriment all over the body are organs of circulation; those which get rid of waste material are organs of excretion.

Alimentary apparatus—the mouth, pharynx, gullet, stomach, and intestines. The alimentary canal is about thirty feet long. The various substances proper for food—that is, those containing the nutritious elements necessary for the support of the body—are both solid and fluid. Alimentary (Latin, *alo*, I nourish). Solids and fluids.

The fluids are taken into the mouth and pass immediately through the pharynx and esophagus to the stomach, while the solids are retained in the mouth to be prepared for the change they are to undergo when they pass into the stomach. This preparation is accomplished by the simultaneous grinding motion of the tongue and internal muscles of the mouth; while the necessary discharge of the salivary glands, three in number,—viz., parotid, submaxillary, and sublingual,—supply the moisture to reduce the mass to the consistency necessary to enter the stomach. When the food is sufficiently ground, it is collected—enveloped in saliva—into a bolus or mass, which rests upon the back of the tongue and is carried backward to the aperture which leads to the pharynx, by which the mass is seized and tightly held, and, the muscular fibers contracting above it, while they are lax below, it is rapidly thrust into the esophagus. By the muscular wall of this tube it is grasped and propelled onward in a similar manner until it reaches the stomach.

Mastication.

Gullet.

The stomach, like the gullet, consists of a tube with muscular walls; in shape it somewhat resembles a bagpipe, having a greater and a lesser curvature; it lies crosswise in the abdominal cavity, and has two openings: one on the left side, which is continuous with the lower end of the esophagus, in the region of the heart, and called the cardiac opening; the other, or pyloric opening, being on the right side. This opening is the beginning of the small intestine, and is guarded by a valve-like construction called the pylorus, or gate-keeper. The stomach is about fourteen inches long, five inches in diameter, and weighs about four ounces, its capacity being five pints.

Stomach.

It is composed of three coats, or layers: the external,

Coats.

serous ; the middle, muscular ; and the internal, mucous, which is the most important layer. In this delicate mucous membrane are numerous small glands which open upon its surface. Some of these glands—the so-called peptic glands—throw out a thin acid fluid, the gastric juice, which consists of water containing a few salines in solution, free hydrochloric acid, and a small quantity of pepsin. This gastric juice appears when the food passes into the stomach, and a nervous action is set up ; then little drops of fluid gather at the mouth of the glands. When the stomach is empty, its mucous membrane is pale, and hardly more than moist ; its small arteries are then in a state of contraction, and but little blood is sent through it. By continued rolling about, with constant addition of gastric juice, the food is reduced to the consistency of pea-soup, and is called chyme. In this state part of it is allowed to escape through the pylorus, and to enter the duodenum, while the rest of the fluid is at once absorbed, making its way by imbibition—suction—through the walls of the delicate and numerous vessels of the stomach into the blood-current.

Gastric juice, fourteen pints in twenty-four hours.

Chyme.

The intestines form one long tube, having coats similar to those of the stomach, and are divided into two portions—the small and large intestines.

Intestines.

The small intestine is the most important organ of digestion,—as in the duodenum, the chyme is converted into chyle,—and it begins at the pyloric extremity of the stomach. The small intestine has a much smaller diameter than the large intestine, and is divided into three portions, the first and shortest portion being called the duodenum—twelve inches long ; second portion, the jejunum—empty after death ; the last portion

Small intestine.

Jejunum empty.

being known as the ileum. The ileum is no wider than the jejunum or duodenum, so that the transition from the small to the large intestine is quite sudden. The opening of the small into the large intestine has prominent lips, which project into the cavity of the latter, and oppose the passage of matters from the large into the small intestine, while they readily allow a passage the other way—viz., from the small into the large. This fold of membrane, called the lips, is the ileocecal valve.

Ileum, twelve inches.

Ileocecal valve.

The large intestine forms a blind dilatation beyond the ileocecal valve, called the cecum, and from this is given off an elongated blind process, which, from its shape, is called the vermiform appendix.

Large intestine.

Blind cecum.

The colon, or first part of the large intestine, passes upward from the cecum and is known as the ascending colon; makes a sudden turn at right angles, and crosses to the left side of the body as the transverse colon; then suddenly bends backward, along the left side of the abdomen, and is called the descending colon; this reaches the middle line and becomes the rectum—that part of the large intestine which opens externally.

Colon.

The mucous membranes of the intestines are provided with numerous small glands, which pour into them a secretion, the intestinal juice, the precise function of which is not known.

Mucous membrane.

The fibers of the muscular coat of the intestines, which lie between the mucous and serous or peritoneal investment, are disposed longitudinally and circularly, the longitudinal being much thinner and placed outside the circular coat. Now, the circular fibers of a part contract successively in such a way that the lower fibers, or those on the side of the anus, contract after the upper ones, or those on the side of the pylorus. From this so-called

peristaltic contraction the contents of the intestines are propelled from their upper to their lower parts.

Peristalsis (Greek)—to contract.

Bile and pancreatic juice are the only secretions besides those of the proper intestinal glands which enter the intestines, the bile being secreted by the liver and the pancreatic juice by the pancreas. Pancreatic juice is an alkaline fluid not unlike saliva ; it only differs in having a quantity of proteid material—viz., albumin and albuminoid constituents. Bile is mucilaginous—golden brown in man, red in carnivora, and green in birds. Bile and pancreatic juice mix with the chyme, before spoken of, and convert it into what is called chyle. As the chyle is thrust along the small intestine by the grasping action of peristaltic contractions, the dissolved matter which it contains is absorbed into the vessels of the villi of the intestine in the ordinary way of osmosis—a property by which liquid and crystalline substances in solution pass through partitions which are ordinarily impervious.

Bile and pancreatic juice.

Bile.

Digestion in the large intestine is very feeble, this intestine being mainly a temporary receptacle for undigested food or refuse matter which is to be discharged from the body. It is in the cecum that an acid reaction is acquired, and the characteristic fecal odor and color, which becomes more marked as they approach the rectum. A second digestion is, by some physiologists, supposed to occur in the upper part of the large intestine.

## NERVES.

As the nerves are the natural stimuli of the muscles, you should know at least something of their structure.

Nerve *tissue* is a soft, marrow-like substance which

Nerve tissue.

forms the principal part of the brain, the spinal cord, and the nerves.

Nerve *fibers* are actually so many parts of the brain and spinal cord, extending into almost every portion of the body. They have the appearance of slender, silvery-white threads, and a certain number of them, inclosed in a sheath, form a nerve. Nerve fibers.

The nervous system consists of two parts : Nerve system.

1. The brain, spinal cord, and cerebrospinal nerves, which form an unbroken connection between the external parts of the body, the sense organs, and the brain.

2. The sympathetic system, which is connected with the organs of circulation, digestion, and respiration.

Some of the nerves are coiled around and enter the muscles of the body and carry to them the command of the brain, thus causing them to contract. These are the motor nerves. Motor nerves.

Other nerves proceed from the various parts of the body to the head center, and convey to it impressions or sensations. These are the sensory nerves. Sensory nerves.

A sensory and a motor nerve generally run side by side, forming one main trunk, each sending off numerous branches in every direction.

All active powers are confined to the gray matter of the brain and cord. Nerves have no independent sensation. Should the spinal cord be crushed, the body below the injured part would be paralyzed.

The spinal nerves consist of thirty-one pairs, given off from the sides of the spinal cord. These are divided into : eight upper, or cervical, nerves ; twelve dorsal ; five lumbar ; five sacral ; one coccygeal. Spinal nerves.

Each spinal nerve arises by two roots, an anterior or motor root and a posterior or sensory root.

The anterior divisions of the spinal nerves supply the parts of the body in front of the spine, including the limbs.

The posterior divisions are generally smaller than the anterior, and are distributed to the muscles and integument behind the spine.

The sympathetic system, as has been said, is connected with the organs of digestion, circulation, and respiration. A close network of the sympathetic nerves is spread around the muscles of the heart, lungs, stomach, and intestines; they also influence the muscles of the vessels generally, when they are called vasomotor nerves.

The subject of nerves might occupy an entire volume, but I think sufficient has been said in these notes to give the pupil an idea of the importance of spinal massage.

## THE BACK.

Bony portions.

The bony portions of the back are the spine, which shows from the seventh cervical, or last vertebra of the neck, down to the sacrum, which forms the back part of the pelvis; the posterior border and spine of the scapula or shoulder-blade; and the rim and back termination of the main portion of the pelvis.

Muscles.

The back is covered by five masses on either side: (1) The thickest and most muscular portion of the trapezius, which is just above the shoulder-blade, between the deltoid and the neck; (2) the scapula and its muscles; (3) the erector spinæ, comprising all the muscles that occupy the space on either side of the spine from the shoulder-blades down to the pelvis; (4) the muscular portion of the latissimus dorsi, which gives the out-

line on the side of the trunk from the shoulder-blade down to the mass of the obliques ; (4) the three oblique muscles combined, which continue the outline of the trunk viewed from front and back down to the rim of the pelvis. The general character of the back is muscular.

In hysteria the principal treatment by massage is confined to the spinal column. Hysteria.

Stroking of spine ; also pressure for twenty minutes. Chorea.

A doctor in Vienna—Tenykovy by name—says he has treated successfully cases of intermittent fever by means of friction along the spine, and with this treatment three-fourths of his patients have done very well without quinin. Intermittent fever.

In this region,—spinal,—while there are no important blood-vessels with which we have to do, we must bear in mind the thirty-one nerves given off from each side of the spinal cord, each nerve forming, with its fellow of the opposite side, a pair. Spinal nerves.

At a short distance from the spinal cord each nerve divides into anterior and posterior branches, the anterior supplying the trunk, extremities, diaphragm, and certain organs. The posterior or smaller branches supply the muscles and skin of the back. Anterior and posterior.

### MASSAGE OF THE BACK.

Patient lying on the face with the abdomen supported by a pillow, the object being to elevate the body and to relax the muscles. No head-rest allowed.

1. Stroking, with both hands, one on each side of the spine, from the base of the skull to the sacrum, the back being divided into three parts : (*a*) Close to the spinal column ; (*b*) the middle of the back ; (*c*) the sides of the back.

2. Friction with the tips of the fingers, in circles from the base of the skull to sacrum, one side at a time, the hands being changed for each side.

3. Stroking, as previously described.

4. Kneading, with the thumbs between the vertebræ; also stretching and kneading all the muscles of the back.

5. Transverse friction.

6. Hacking, with one hand on each side of the spinal column, from the base of the skull to the sacrum, and from the sacrum to the base of the skull.

7. Clapping of the sides may also be used.

In treating a child by massage of the back, stroking should be performed with two fingers, one on each side of the spine.

## BONES OF THE HEAD AND FACE.

The head comprises the cranium, or skull, and the face.

The cranium—the hollow part of the head—contains the brain, which is the center of the nervous system. It consists of eight bones—one frontal, two parietal, two temporal, one occipital, one sphenoid, one ethmoid.

Bones.

The *frontal* bone forms the forehead.

The *parietal* bones form the vault or crown of the cranium and a large part of its sides.

The *temporal* bones contain the deep parts of the organs of hearing.

The *occipital* bone forms the back part of the head and a large part of the base of the skull. It is by this bone that the head is joined to the neck.

The face contains fourteen bones, but I will mention only the names of a few of them.

The *superior maxillary* bones form the upper jaw.

The *malar*, or cheek bones, form the prominence of the cheek and assist in completing the orbital cavities.

The *inferior maxillary* forms the lower jaw.

The *nasal* bones form the bridge of the nose.

## MUSCLES OF THE HEAD AND FACE.

The muscles in this region are numerous, and it is my intention to speak only of the most important, as regards the massage of these parts.

*Occipitofrontalis.*—United by a broad tendon over the top of the cranium; moves the scalp and wrinkles the forehead horizontally.

*Temporal.*—Closes the teeth, as in chewing.

*Orbicularis palpebrarum.*—Closes the eyelids.

*Compressor nasi.*—Compressor of the nose; acts on the cartilages of the nose.

*Levators* of the nose and upper lip.—Raise the lip and sides of the nose.

*Zygomaticus.*—Used in laughing to extend the corners of the mouth.

*Orbicularis oris.*—Closes the mouth.

*Square muscle* of the chin.—Depresses the lower lip.

*Buccinator*, or cheek muscle.—Keeps the food between the teeth by compressing the cheeks. It also retracts the angle of the mouth.

*Masseter.*—Closes the teeth in mastication.

## MASSAGE OF THE HEAD AND FACE.

### MASSAGE OF THE HEAD.

1. Place one hand—the left—on the forehead, and with the other hand stroke firmly from the top of the head downward.

2. Friction, with the heel of the hand, in circles, always supporting the head with the other hand.

3. Hacking, or punctation, both hands striking at the same time to equalize the effect.

### MASSAGE OF THE FACE.

1. Stroking, with the thumbs placed between the brows, over the temples to the ears; both thumbs working together to act upon the supra-orbital nerve, which lies in a bony groove in the forehead just above the upper eyelids.

2. Place the index-finger—protected by a thin, perfectly clean cloth of some sort—inside of the mouth, and perform stroking, friction, and pinching with the thumb, making the orbicularis oris—the muscle which closes the mouth—the center of the manipulation.

3. Use the thumb and index-finger, and pick up the muscles of the cheek, working upon them with a rotary motion.

## MASSAGE OF NECK AND THROAT.

### MASSAGE OF THE NECK.

In massage of the neck we have Gerst's method for the front of the neck, which affects the circulation, and Hoeffinger's for the back of the neck, affecting chiefly

the muscles. In manipulating the front of the neck the patient sits with the head thrown backward, so as to expose the part. The operator, standing in front of the patient, places the radial border of his hands at the lobes of the ears, and strokes downward and outward to the shoulder. The heels of the hands thus follow the course of the sternocleido muscles and the blood-vessels of the neck.

Hoeffinger's method is particularly beneficial to the muscles on the back of the neck, and consists of firm strokings from the occiput downward, covering the trapezius muscle. The operator should stand behind the patient, and place his hands behind the ears.

### MASSAGE OF THE THROAT.

The patient should sit in a semi-reclining position, the operator at the side.

1. Stroke with the thumb on one side and the middle and index-fingers on the other side of the trachea.

2. Give friction smoothly and evenly around the throat, and finish with stroking as first described, with the addition of slight shakings.

Avoid direct pressure upon the trachea—windpipe—by having the elbow of the operator supported.

*Note.*—For a description of the larynx and trachea, see notes on the respiratory apparatus.

## GENERAL MASSAGE.

"Massage is a thoroughly scientific remedy, based on good physiology and sound common sense, the value of which, in properly selected cases, no one who has any knowledge of the matter can possibly question; and which, doubtless, when improperly applied, is capable of doing much

injury, as any other powerful treatment may under similar circumstances." —Prof. Playfair, " Brit. Med. Journal," June 30, 1883.

General massage consists in the treatment of the entire body, except the head, neck, and throat.

It is not a matter of importance whether one begins with treating the upper or the lower extremities of the patient, but it is my custom to begin with the right lower extremity. The temperature of the room in which the treatment is given should be from 70° to 75° F., according to the condition of the patient. The patient should be lying on a bed or couch, wrapped in a blanket ; the bladder should be evacuated, and all the muscles of the patient relaxed, before beginning the treatment.

Begin with the manipulation of the right lower extremity, as described in the chapter on massage of that part. After it has been thoroughly treated, cover it carefully, and then treat its fellow.

Next in order come the upper extremities, which are treated as directed in the notes on Massage of the Arm. The chest should then claim the attention of the operator ; after it, the abdomen ; lastly, the back. If this order of treatment is pursued, the patient is left in a more comfortable condition than is the case when the abdomen is treated last, as is the practice of many operators.

In my opinion, too much attention is given, in general massage, to the manipulation of the hands and feet. When there is anything radically wrong with those members, of course they deserve consideration, but under ordinary conditions the thorough manipulation of the adjacent parts will be quite sufficient. In the case of the feet, if the thighs and legs are properly treated, the blood-supply of the feet being here, they

will readily become warm. Many people object to having their feet treated, as they insist "it makes them nervous."

## LOCAL MASSAGE.

Local massage is intended to act upon and to benefit some particular portion of the body, and a knowledge of the structure of the part worked upon is very essential, as it may be necessary, in order to obtain certain results, to work upon only one muscle or mass of muscles; you should know the action and location of these muscles.

Remember that *nature* has provided you with all the instruments needed in giving massage, and what is asked of you is to use them skilfully. If you have a large surface or mass of muscles to treat, use as much of the hands as possible, moving carefully the tissues of the patient. In case the part to be manipulated is small and delicate, select the proper instruments for the work,—viz., one or two fingers,—and use them dexterously.

In treating fractures or sprains always begin *above* the seat of the injury, by stroking centripetally; then stroke below the injured part, and away from it, thus preventing an excess of blood.

After thoroughly stroking in the manner suggested, carefully give light frictions, working first above and then below the seat of the trouble; when, after a treatment or two, you will be able to work lightly over the injured part. In fractures the principal thing is to avoid careless handling or jerking of the parts, as you are liable to undo what the surgeon has done. Always support the fractured parts with one hand while you work with the other; or, better still,—say in the case of

a fracture at the elbow,—slip your arm under the arm of the patient, so that both the forearm and arm proper will be at rest. If the parts to be treated should be thoroughly bathed in hot water, it will greatly assist your work, especially if the hot water is applied just before you begin your manipulation. If tenderness exists, use a lubricant of some sort and work carefully.

## GENERAL SUGGESTIONS.

One of the first requirements in an operator is that he or she should be personally agreeable to the patient; otherwise there is a certain amount of resistance, which uses up the nervous force of the patient, and instead of the treatment being a tonic, and at the same time a sedative, it becomes a depressant and an irritant.

If the patient is well enough to talk at all, the conversation should be limited to cheerful subjects, and disease in any of its forms should be tabooed. Scrupulous cleanliness in the person and clothing of the operator is obligatory; and the hands should always be washed—preferably in the presence of the patient—before beginning the treatment, even if that operation has been performed just previous to "going to a case."

If the patient has any whims, humor them—if this can be done without detriment to desired effects. In case minute directions as to treatment are given by the attending physician, follow them faithfully; but when left to your own devices, use your best judgment, considering carefully the particular needs of the patient.

Avoid arrogating to yourself the offices of a physician, as you are only one of the lesser means to an end; or, we may say, one of the medicines used in the restora-

tive process. Never make unnecessary flourishes with your hands, for by so doing you will not only uselessly tire yourself, but will cause needless mental friction to your patient, who, if at all sympathetic, will feel sorry that you are obliged to work so hard. In nervous cases avoid too much sameness in the daily treatment, especially in " rest-cure " patients, remembering that massage is one of the few diversions allowed them. Learn to work equally well with either hand, so that the patient need not turn nor twist in order to better accommodate your movements.

In deep kneading avoid " wabbling," grasp the tissues firmly, roll them and full them, so that the belly of the muscle will be pushed up between your hands. If you have a knowledge of the muscle or mass of muscles upon which you are working, there will be no danger of pinching and hurting the patient. It is only when you attempt to separate the muscle fibers and do not grasp the whole muscle that you are likely to cause discomfort. Keep your hands close to the patient, and thus avoid unnecessary action on your part, at the same time giving a sense of repose and comfort to the patient. If your hands are moist, use a little talcum powder.

Do your work faithfully and well, and you will have no reason to regret the fact that you are only a handmaid in the house of Medicine.